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AIRCRAFT ACCIDENT INVESTIGATION

F-16C SN 87-1289

HAHN AIR BASE, FEDERAL REPUBLIC OF GERMANY

APO NEW YORK 09122

21 DECEMBER 1988

CLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh. No. 103
 in the matter of PFS
 Staff _____ IDENTIFIED
 Applicant RECEIVED
 Intervenor _____ REJECTED _____
 Other _____ WITHDRAWN _____
 DATE 7/1/02 Witness _____
 Clerk g

ERWIN C. CATTS III, Lt Col, USAF
Investigating Officer

DAVID S. RODEN, TSgt, USAF
Technical Advisor

DANIEL J. MCGRAW, Capt, USAF
Legal Advisor

PFS Exh. 103

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INTRODUCTION

On 12 October 1988, an F-16C, Serial Number 84-1289, assigned to the 50th Tactical Fighter Wing, Hahn Air Base, Federal Republic of Germany, crash landed short of runway 21 at Hahn Air Base. The mission was planned and flown as a simulated intercept sortie from Zweibrucken AB with a recovery at Hahn. At the final approach speed (FAS) point, the pilot reduced power to slow to FAS. When the aircraft slowed below FAS, the pilot initiated a power increase by first selecting military and then maximum afterburner power. The pilot felt no acceleration, a significant sink rate developed, and the aircraft impacted the ground just outside the airfield boundary. The pilot ground egressed with minimal injuries.

I. STATEMENT OF AUTHORITY AND PURPOSE.

A. Pursuant to Headquarters Seventeenth Air Force Special Order M-12, 14 December 1988, effective 23 November 1988, (Tab Y-2), Lieutenant Colonel Erwin C. Catts III, 36th Tactical Fighter Wing (TFW), Bitburg Air Base (AB), Federal Republic of Germany (FRG), was appointed to conduct an aircraft accident investigation (Tab Y-1) into the circumstances surrounding the accident involving F-16C, serial number 84-1289, 50th Tactical Fighter Wing (TFW), Hahn AB, FRG, which resulted in the destruction of the aircraft and minor injury to the pilot. Pursuant to the same order, Capt Daniel J. McGraw, 36th TFW, Office of the Staff Judge Advocate, Bitburg AB, FRG, was detailed legal advisor for the investigation. Lt Col Catts requested technical assistance and was aided in the investigation by Technical Sergeant David S. Roden, 36th CRS, Bitburg AB, FRG, from 30 November 1988 until the investigation was completed. (Tab Y-3)

B. Lt Col Catts conducted the investigation in accordance with AFR 110-14 and was guided by the provisions of AFR 120-4. One of the objectives of the investigation was to obtain and preserve all available relevant facts and evidence pertaining to the accident. Another objective was to investigate the circumstances leading to the accident and subsequent damage for use in claims, litigation, disciplinary actions, adverse administrative proceedings, or other purposes deemed appropriate by competent authorities.

C. Formal inquiry by the investigating officer and legal advisor began on 23 November 1988 at Hahn AB, FRG. The specific areas investigated included, but were not limited to:

1. History of Flight Activity
2. Authority and Purpose for Flight
3. Mission Preparation and Briefing
4. Flight Activity
5. Maintenance Supervision and Documentation
6. Pilot Qualification
7. Mishap Sequence
8. Crash and Rescue
9. Aircraft Systems Operation
10. Supervision
11. Medical
12. Weather
13. Directives
14. Damage and Claims

II. SUMMARY OF FACTS.

A. HISTORY OF FLIGHT ACTIVITY.

1. On 12 October 1988, the mishap pilot and his flight lead were sent to Zweibrucken Air Base in a government vehicle to return two F-16C's to Hahn Air Base. The two aircraft had been left at Zweibrucken, after cross-service training, the day prior to the mishap due to deteriorating weather conditions. After obtaining takeoff clearance, the mishap pilot, Creek 2, perceived a possible engine problem during initial engine runup. After cycling the throttle, the engine appeared to be operating normally and he informed the flight lead that he was ready for takeoff. Creek 2 then aborted his formation takeoff attempt due to a procedural error. After the abort, Creek 2 accomplished a normal single ship takeoff at 1357 CET and rejoined with Creek 1. They proceeded to the Ardennes area of Belgium for low level intercepts until recovery fuel was reached. Creek flight re-entered Federal Republic of Germany air space under visual flight rules (VFR) conditions and obtained an instrument flight rules (IFR) pickup from Eifel control. The flight was split up prior to the initial approach fix (IAF) for single ship ASLAR (Aircraft Surge Launch and Recovery) approaches. Creek 1 landed uneventfully. Creek 2 intercepted the instrument landing system (ILS) course and glidepath at 18 nautical miles and proceeded inbound. Creek 2 broke out of the weather at two and a half nautical miles, visually acquired the runway, and pulled the throttle back to slow to his final approach speed of 11 degrees angle of attack (AOA). While the mishap pilot was attempting a valsalva maneuver (pinching his nose and exhaling to clear his ears), he noticed his AOA had increased beyond 11 degrees. The pilot initiated a power increase as the aircraft slowed below final approach speed, selecting first military and then maximum afterburner power. The pilot felt no acceleration and a significant sink rate developed. The aircraft impacted the ground approximately 450 feet short of the overrun of runway 21 at Hahn Air Base at 1512 CET. The pilot did not attempt to eject. The aircraft sheared its landing gear, skidded up a slight incline onto the overrun and came to rest with the tail section on fire. The pilot was able to ground egress prior to arrival of rescue personnel. (TABS V-1, V-2, V-9, V-16)

2. News media concerning the accident included a news release from the 50th Tactical Fighter Wing Public Affairs, which was provided to the Associated Press, Armed Forces Network, and United Press International. (Tab 0-12) In addition, articles appeared in The Stars and Stripes on 13 October 1988 (Tab 0-13) and 14 October 1988 (Tab 0-14). Also, an article appeared on the front page of the Hunsruecker Zeitung on 13 October 1988. (Tab 0-15)

B. MISSION. The mission of "Creek Flight," a flight of two F-16 aircraft, was to launch from Zweibrucken Air Base and conduct low level navigation training en route to the Ardennes area of Belgium and then to conduct low level intercepts on any simulated "target-of-opportunity" aircraft within that area. Upon completion of intercept training, the aircraft were to recover at Hahn Air Base. (Tab V-1.7, V-2.7, V-9.7)

C. BRIEFING AND PREFLIGHT.

1. The flight lead and mishap pilot completed their duties the day prior to the mishap in time to afford themselves normal crew rest and were mentally and physically prepared to fly. (Tab V-1.3, V-2.3) On 12 Oct 88, Capt Wilmot, the mishap pilot, reported for duty before 0600 hours for a locally scheduled mission that was subsequently weather cancelled prior to the flight briefing. (Tab V-2.3) Capt Wilmot had gone to breakfast and returned to the squadron when Major Pruitt, the acting Top Four (one of four senior pilots in the squadron who could act as the squadron supervisor), notified him that due to weather conditions, a weather category B pilot was needed to replace the weather category C wingman originally scheduled to pick up one of the off station aircraft at Zweibrucken. Capt Wilmot was initially reluctant to volunteer because of a special project workload but agreed to go. Capt Calamoneri, the flight lead, gave Capt Wilmot a brief overview of their expected mission prior to their departure for Zweibrucken. A vehicle was dispatched at 0845 and they arrived at Zweibrucken at approximately 1030. (Tab V-1.2-1.5, V-2.4-2.5, V-9.4-9.7) The latest weather forecast at Zweibrucken prompted Capt Calamoneri to change his mission plan from surface attack to a low level route to the Ardennes area of Belgium for intercept training. (Tab V-1.5) Mission planning and map preparation were accomplished prior to the flight briefing by the flight lead. A briefing guide was used for the briefing (Tab V-2.8). Recovery at Hahn was briefed as standard for IFR conditions. After the briefing, the pilots contacted the squadron Top Four, Maj Pruitt, and were directed to delay their takeoff because of weather. The pilots were able to eat lunch and discuss aircraft status with their crew chiefs prior to receiving permission to launch. (Tab V-1.7-1.8, V-2.10, V-9.7-9.8, V-12.3, V-13.3)

2. No misunderstandings were evident during the preparation for flight. Normal squadron facilities and a mission planning computer were not available, but this did not impact on the mission. The only question Capt Wilmot had after the briefing concerned local ramp coordinates for the internal navigation system (INS) alignment. Two Hahn F-16 crew chiefs had been dispatched to Zweibrucken to perform engine chip detector checks on the

aircraft prior to launch. They also performed normal pre-flight and launch procedures. The mishap pilot performed all briefed pre-flight items in a normal manner. (Tab V-1.5, V-2.9, V-12, V-13)

3. The mishap pilot required two start attempts on his aircraft, which the crew chief explained was normal for the aircraft. (Tab V-2.11, V-12.3-12.4). The flight lead required a second INS alignment after taxiing to the runway. (Tab V-1.8) Creek flight also experienced a delay in obtaining their IFR flight clearance. The weather had improved to VFR conditions, however, so the flight lead decided to depart VFR and briefed a formation takeoff on the radio, deleting the planned radar trail departure. (Tab V-1.9, V-2.12, N-3)

D. FLIGHT ACTIVITY.

1. The flight plan submitted by Capt Calamoneri was filed under a combination of Instrument Flight Rules (IFR) and Visual Flight Rules (VFR). The submission was normal for the forecast weather and planned mission. (Tab K-1)

2. Radio transmissions for Creek Flight and all controlling agencies were normal. When Eifel cleared Creek Flight for the ASLAR approach to Hahn, they were tagged within the air traffic control (ATC) system as tactical aircraft control and navigation (TACAN) approaches. Both the flight lead and mishap pilot flew ILS approaches. (Tab V-1.15, V-2.22, V-8.3) Creek 2 was communicating with Hahn ground control approach (GCA) when the mishap occurred. The mishap pilot made two "on-the-go" transmissions on the GCA ultra high frequency (UHF) shortly before impact. The first transmission was received garbled by the controller, who stated, "Say again," to Creek 2. After his second "on-the-go", no other transmissions were made by the mishap pilot. (Tab N-17, V-8.5)

3. Investigation revealed that navigation, terrain, and weather presented no difficulties and were not a factor in this accident. (Tab O-17, W)

4. After being cleared on to the runway for takeoff, and receiving the run-up signal from Creek 1, Creek 2 pushed his throttle to a position that he expected would give him approximately 80 percent revolutions per minute (RPM) and checked his flight controls and engine instruments. The RPM was less than expected, approximately 74 percent, so he advanced the throttle a little further, but again did not see the increase in RPM that he expected.

He notified his flight lead that he had a problem and reduced his power to idle. Creek 1 acknowledged the transmission and waited for Creek 2's go/no go decision. Creek 2 advanced his throttle a second time; the RPM reached 80 percent and all other engine instruments checked normal. Creek 2 notified Creek 1 that his engine was good and he was ready for takeoff. At this point Creek 2 inadvertently pulled his power back to idle. Creek 1 gave the standard head nod signal and advanced his throttle to military power as he released his brakes. Creek 2, recognizing his error, pushed his throttle up to military power and was about to select afterburner when he saw Creek 1's afterburner lighting. Because of their initial discrepancies in power settings, Creek 1 was pulling away from Creek 2 and, suspecting an engine problem, asked Creek 2 if he was going to abort. Creek 2 replied affirmative and aborted. Creek 1 completed a single ship takeoff, while Creek 2 turned off at the first taxiway. Creek 2 notified his airborne flight lead that he did not abort because of an engine problem, but because he was inadvertently in idle at brake release, and that he would attempt another takeoff. Creek 1 acknowledged and designated an airborne rendezvous point. Creek 2 obtained clearance to taxi back to the active for another takeoff attempt. He reviewed the engine operating limitations and, when cleared for takeoff, did another thorough engine run-up and review. Creek 2 accomplished a single ship afterburner takeoff with normal engine indications at all power levels. (Tab V-1.10-1.12, V-2.12-2.17, N-2)

Creek 2 climbed through a hole in the lower cloud layer and rejoined Creek 1 at 6,000 feet, approximately 20 miles northwest of Zweibrucken. They accomplished a standard operations check and continued along their route to the Ardennes area of Belgium. In the Ardennes area, they accomplished several uneventful intercepts of other aircraft until they reached bingo fuel (previously planned fuel level to stop training and return to base). Creek flight re-entered German airspace under VFR rules until impending weather forced them to pick up an IFR clearance from Eifel control. They received typical vectors and altitude changes from Eifel en route to Hahn. Eifel, at Creek 1's request, then split the flight and gave separate vectors to Creek 1 and 2 for individual approaches to Hahn. (Tab V-1.12-1.15, V-2.17-2.22, N-10) After several vectors for spacing, Creek 1 was cleared for an ASLAR approach. Creek 2 was vectored to a point approximately six miles in trail of Creek 1 and was also cleared for the approach. Creek 1 flew an ASLAR ILS and landed uneventfully. Creek 2 intercepted the ILS course and glidepath at approximately 18 nautical miles and proceeded inbound. Creek 2 was then handed off to Hahn GCA, received a radio and a gear check and clearance to land at five nautical miles. Creek 1 had notified Creek 2 that he had broken out of the weather at approximately 1,000 feet and had visually acquired the runway at about 5 miles. (Tab V-1.15-1.17, V-2.21-2.24) Creek 2 was on glidepath with normal configuration--gear down, flaps down, speed brakes out,

landing light on and holding 180 knots indicated airspeed--when he broke out of the weather and visually acquired the runway at about 2 1/2 miles. (Tab V-2.25)

The ASLAR approach required the mishap pilot to pull the throttle back to reduce his airspeed to final approach airspeed of approximately 150 knots indicated airspeed, or 11 degrees angle of attack (AOA), at 3 nautical miles. (Tab O-2). The mishap pilot stated he did not normally use the aircraft trim system while flying an approach, and did not do so on this flight. (Tab V-2.47) (Aircraft trim system use is discussed at Paragraph 5.3.a. of the report). The mishap pilot had felt some discomfort from pressure behind his ears and, with the runway in sight, took his hand from the flight control stick, dropped the right side of his mask with his right hand and attempted to valsalva. Taking a hand from the flight control stick during approach should cause no significant change in flight. (Tab V-19.11) While doing his valsalva maneuver, he noticed that the AOA had moved past 11 degrees, to approximately 13 degrees, and he attempted to correct this by adding power, but got no response. The pilot continued to attempt to increase power as the AOA increased to 15 degrees. This AOA caused the high AOA warning horn to come on. The mishap pilot advanced the throttle to military power and then retracted the speed brake. The aircraft continued to slow and at approximately 1 nautical mile began to descend below the instrument glidepath. The mishap pilot pushed the throttle into full afterburner and transmitted on Hahn GCA UHF frequency that he was going around. Creek 2 did not feel any increase in thrust, noted an increasing descent rate and realized that he was going to hit the ground. The mishap pilot did not look at any engine instruments and did not activate any engine control switches. Creek 2 did not jettison any external stores and made a decision not to eject, feeling that he was out of the election system performance envelope. (Tab V-2.23-2.37)

E. IMPACT. The aircraft impacted at geographic coordinates north 49 degrees, 57.7 minutes, and east 7 degrees, 16.7 minutes, or approximately 450 feet prior to the overrun for runway 21 at Hahn Air Base, Germany. The time was 1512 CET. The aircraft impacted the ground in a wings level, nose high attitude with the engine exhaust nozzles striking the ground first. The aft section of the aircraft caught fire. The aircraft tore through the field boundary fence, sheared its landing gear and continued to slide up and onto the runway overrun. The aircraft came to a stop approximately 200 feet from the runway threshold with its tail section on fire and the cockpit section of the aircraft broken at the inlet. The impact was not severe enough to put impact marks on control and performance instruments and therefore precise attitude, airspeed and angle of attack at impact are unknown. (Tabs A, V-2.28, V-3.6, V-6.3, Z-5, Z-6)

F. EJECTION SEATS.

1. The pilot did not attempt ejection. However, when the cockpit section broke just behind the ejection seat, the seat seemed to be rising and the pilot thought that he was being ejected. (Tab V-2.28)

2. The canopy remained attached to the aft portion of the aircraft and appeared to be floating several inches above the canopy rails. The pilot did not feel that normal canopy opening or jettison would operate. Upon observing fire at the aft end of his aircraft, he was able to lift the canopy from its hinges and throw it from the aircraft. (Tab V-2.28)

G. PERSONAL AND SURVIVAL EQUIPMENT.

1. All personal and survival equipment inspections were current. (Tab U-112,112a). After disconnecting his seat belt and shoulder harnesses, the pilot stood up and, feeling resistance from his emergency oxygen hose, felt he had to remove his oxygen hose connection to disengage himself from the seat. (Tab V-2.39)

H. RESCUE.

1. The mishap aircraft crashed at 1512 CET. (Tab A-1)

2. Because the aircraft crashed on short final without an in-flight emergency (IFE) declared, there were no rescue units alerted prior to the actual crash. The first rescue call was made on the "crash net" within seconds after tower personnel observed the mishap. (Tab V-7.7, N -12)

3. The first unit to respond was "Ramp 24," the rescue patrol unit on duty at the time of the mishap. "Ramp 24" was located at pad 40, about a mile and a half from the impact site, when the operator observed smoke at the approach end of the runway and immediately responded. En route to the accident site, "Ramp 24" received a radio call over the crash net verifying that an aircraft had in fact crashed. (Tab V-16.3)

4. When "Ramp 24" arrived at the mishap site, the pilot had already ground egressed from the aircraft and was being attended to by two transient alert personnel who were near the approach end of runway 21 when the mishap occurred. The pilot was in the grass away from the aircraft and appeared to be shaken up, but not seriously injured. (Tab V-16.4, V-20)

5. The mishap aircraft had come to rest after sliding 800 feet onto the overrun of runway 21, near the barrier.

I. CRASH RESPONSE.

1. The crash response was initiated at approximately 1512 CET, immediately following aircraft impact. Ramp 24 responded directly when its operator observed smoke at the approach end of the runway. (Tab V-16) Shortly thereafter, the fire and rescue vehicles that had been alerted over the "crash net" began arriving. A total of 13 fire and rescue vehicles responded. (See list at Tab O-16). The pilot was treated at the scene by rescue personnel until an ambulance arrived with a flight surgeon who assumed medical responsibility. (Tab V-17, X). The pilot was then transported to the Hahn Air Base Hospital emergency room for further treatment and observation. (Tab X)

2. No delays were reported in the rescue or fire fighting effort. (Tab V-15, V-16)

3. No difficulties were encountered in the rescue effort. (Tab V-17, V-18)

J. MAINTENANCE DOCUMENTATION.

1. AFTO 781 Logs. No maintenance discrepancies were noted which related to the mishap. (Tab U-110)

2. All time compliance technical orders on hand were completed. (Tab U-86)

3. All scheduled inspections were completed. No outstanding discrepancies were found which related to the mishap. (Tab H-2)

4. The oil sample from the previous flight was taken and recorded without any abnormal readings. The engine had recently been installed on 27 September 1988. (Tab H-2, U-4, U-5)

5. All time compliance technical orders (TCTOs) for which kits were available were completed. TCTOs which had not yet been completed were not related to the accident. (Tab H-2, H-3)

6. There were no overdue time change or unscheduled maintenance inspections which related to the mishap. (Tab H-2, H-3, U-86)

7. No unscheduled maintenance had been performed on the aircraft prior to mishap, other than chip detector inspection. (Tab U-110)

8. There were no local maintenance practices or procedures at Hahn Air Base which contributed to the mishap. (Tabs U and H)

K. MAINTENANCE PERSONNEL AND SUPERVISION.

1. Pre-flight servicing of the aircraft was completed without any defects noted. (Tabs U-107-113, V-12)

2. AF Form 797, Job Qualification Standard Continuation Sheets, were up-to-date and all personnel were qualified. (Tab U-67)

3. There were no maintenance supervisory practices or procedures at Hahn Air Base which contributed to the accident. (Tabs H and U)

L. ENGINE, FUEL, HYDRAULIC, AND OIL ANALYSIS.

1. All engine inspections were completed in a timely manner with thorough documentation. (Tabs H-2, H-3, U-112)

2. Fuel test report was normal. (Tab U-104)

3. Hydraulic test reports were normal. (Tab U-5)

4. Oil test report was normal, but engine was newly installed and an oil analysis program (JOAP) trend had not yet been developed. (Tabs U-4, U-5)

M. AIRFRAME AND AIRCRAFT SYSTEMS.

1. Systems and Power Plant.

a. A thorough review of all evidence indicated that all aircraft systems (hydraulic, electrical, mechanical and avionics), both normal and emergency, with the exception of the engine, were operating normally. (Tabs V-2.22, 0-5, 0-6, 0-8)

b. The pilot testified that the aircraft engine had operated normally from takeoff throughout the mission until within three nautical miles of the runway. (Tabs V-2.16, 2.19, 2.20, 2.22). At approximately two and one-half nautical miles from the runway, the pilot retarded the throttle in

order to slow to his final approach angle of attack. As the AOA increased slightly, the mishap pilot began to move the throttle up to approximately 80 percent (RPM). Then, the 15 degree AOA warning horn came on and he continued to push the throttle up to military power. The pilot retracted the speed brake and, after sensing no additional thrust or acceleration, pushed the throttle into maximum afterburner. The pilot testified that he still felt no additional thrust or acceleration and that he now sensed a rapid descent rate. The pilot was aware of a high AOA, but did not feel that the pitch attitude was unusually high. The pilot maintained aft stick and full afterburner throttle position, expecting engine acceleration and additional thrust to accomplish his go around. The aircraft did not respond and impacted the ground shortly thereafter. (Tabs V-2.25-2.27, V-2.29-2.32, V-2.35-2.36)

c. Witness testimony indicated that the aircraft appeared to be on glide path until approximately one nautical mile from the runway. This was also confirmed by a flight path tracing on the Hahn GCA radar scope. (Tab Z-4) Five witnesses testified that they observed smoke and/or a vaporized liquid coming from the engine nozzle area just prior to, and during the initiation of, the rapid sink rate of the aircraft. (Tabs V-3.2, V-4.3, V-5.3, V-6.2, V-7.3)

d. Engine inspection revealed the following factors:

- 1. The throttle was in the full afterburner position. (Tabs J-7, Z-7)
- 2. Engine RPM was approximately 81 percent. (Tabs J-7, Z-7, Z-9)
- 3. The augmentor exhaust nozzle was full open at impact. (Tabs J-7, Z-8)

e. The following engine accessories were removed from the engine and shipped to contractor facilities: (Tabs I-1.1-1.4, J-10)

- 1. Augmentor fuel pump, serial number TPCA4723.
- 2. Augmentor fuel pump controller, serial number VAA34533.
- 3. Unified fuel control, serial number FJA51458.

- 4. Main fuel pump, serial number TRWB0535.
- 5. Engine electronic control, serial number EECA2407.
- 6. Convergent exhaust nozzle control, serial number TOD55736.
- 7. Nozzle actuators, serial number, AVH14824, and AVG1118776.

2. The unified fuel control is the only engine component in which a failure mode would result in a low RPM and an open nozzle. (Tab J-7,8) The mishap unified fuel control has a history of no response to throttle movement and of low thrust dating back to 1986. (Tab J-11,12) This unified fuel control had been returned to the F-100 engine depot repair facility at San Antonio Air Logistics Center (SA-ALC), Kelly AFB, Texas, a total of four times since November 1986 for tear down deficiency reports and/or repair. After each depot repair, this unified fuel control was returned to serviceable stock.

<u>Date</u>	<u>Reason Returned</u>	<u>Material Deficiency Report</u>
10 Nov 86	No response to throttle.	YES
16 Apr 87	Afterburner blowout.	NO
14 Jul 87	Low power/thrust loss.	NO
16 Jul 88	Low thrust.	NO
(Tab J-11,12)		

3. On 3 Aug 88, this unified fuel control was installed on an F-100 engine, serial number 705255, at Hahn Air Base. This engine, with the unified fuel control, was installed into aircraft 84-1289 two flights prior to the mishap on 27 September 1988. The unified fuel control (UFC) accumulated approximately five hours of operating time from the last depot repair until the mishap. (Tab H-2, U-113)

4. A special management team, the Multiple Reject Team, was formed at SA-ALC in September of 1987 to identify and solve problems with UFCs that exhibited recurring deficiencies. The criteria established by SA-ALC for recognition of problem UFCs did not identify the history of intermittent failures by this UFC prior to the failure in July 1988. (Tab J-13,14) Therefore, this unified fuel control was returned to service after routine inspection, adjustment and repair in August 1988.

N. OPERATIONS PERSONNEL AND SUPERVISION.

1. The mission was conducted on the authority of Captain Calamoneri, the flight lead, as recorded on the DOD international flight plan, DD Form 1801. (Tab K-1) Approval for the flight from the 50 TFW Director of Operations was passed to the members of Creek Flight by the 496th TFS Assistant Operations Officer, Major Pruitt. (Tab V-9.8)

2. The mission was briefed at Zweibrucken Air Base by the flight lead, Captain Charles F. Calamoneri. The mishap pilot testified that Captain Calamoneri used the briefing guide in the in-flight guide. No squadron supervisors were present for the briefing; however, telephonic contact was made with the parent squadron and return instructions received prior to, and after, the briefing. (Tab V-1.5, V-1.6, V-2.8, V-9.7)

O. CREW QUALIFICATIONS.

1. The mishap pilot was a mission ready pilot in the 496th TFS and Chief of Training for the squadron. (Tab G-17, V-2.2). Prior to the mishap, Captain Wilmot had a total of 1,796.1 flying hours, of which 269.1 were in the F-16. Captain Wilmot graduated from pilot training in August 1981 as a distinguished graduate. His first assignment was as a T-37 instructor pilot at Williams Air Force Base, Arizona. His next assignment was as an instructor pilot at the ATC Pilot Instructor Training School, at Randolph Air Force Base, Texas. He attended fighter lead in training at Holloman Air Force Base in March 1987 and then proceeded to Luke Air Force Base for the F-16 B course followed by the C course. (Tab V-2.1) Captain Wilmot's progress at Luke during his F-16 training was characterized as normal to above average. (Tabs G-18-23) Captain Wilmot arrived at Hahn Air Base in December 1987 and progressed normally through his mission qualification training. A thorough review of his training records and training summaries revealed no discrepancies which could be associated with this accident. (Tab G-26-101) Captain Wilmot had recently been upgraded to a weather category B pilot. (Tab G-24,25) He had also been recently selected for entry into the flight lead upgrade training program, and his maturity, ability, and decision-making capabilities were highly regarded by squadron supervisors. (Tabs V-10, V-11, V-14) Captain Wilmot was fully qualified to perform the mission he flew that day. (Tab G-17)

2. Captain Wilmot's recent flying experience is summarized below:

<u>Period</u>	<u>Sorties</u>	<u>Hours</u>
30 days	9	14.4 flying hours
60 days	17	26.7 flying hours
90 days	34	49.4 flying hours

Captain Wilmot's last flight was on 5 October 1988, seven days prior to the incident. (Tab G-2)

3. Captain Wilmot has completed three flight evaluations in the F-16.

a. Initial Qualification/Instrument, 21 May 1987, Luke Air Force Base: qualification level - Qualified. One discrepancy noted; Instrument pattern, minor deviations in airspeed control and radio procedures.

b. Initial Tactical, 21 January 1988, Hahn Air Base: qualification level - Qualified. No discrepancies.

c. Instrument/Qualification, 27 September 1988, Hahn Air Base: qualification level - Qualified. One discrepancy noted: Departure, examinee failed to meet required altitude restriction by 2500 feet on standard instrument departure. (Tabs G-11-16)

P. MEDICAL.

1. The mishap pilot was medically qualified for flight duties. (Tab T-1).

2. A postmortem was not applicable. Toxicology report on the mishap pilot indicated that no drugs or foreign substances were present. (Tab X)

3. The mishap pilot had a thorough physical examination by a Hahn Air Base flight surgeon immediately following the accident. The examination revealed that he had sustained only minor injuries--mild tenderness in his left knee and also mild tenderness around the neck. The injuries were compatible with a left knee contusion and a cervical strain. The mishap pilot also complained of some bilateral ear fullness. Examination revealed a small amount of fluid present bilaterally, without hemorrhage behind each ear drum, which was compatible with an ear block. (Tab X)

Q. NAVAIDS AND FACILITIES. Notices to airmen (NOTAMs) were not a factor in this accident. All NAVAIDS and facilities were functioning normally on the day of the mishap. There is no evidence that any facility outage or malfunction contributed to the mishap. (Tab 0-17)

R. WEATHER. The weather in the mishap area was forecast by Zweibrucken to be 8,000 meters visibility with rain showers, ceiling 3,000 feet. (Tab W-2) Actual weather of 6,000 meters in fog with four-eighths stratus clouds at 400 feet and a ceiling of 1,000 feet was relayed by Eifel Control and the Hahn supervisor of flying to Creek flight. (Tab N-8, V-1.15, N-8). The pilot of Creek 1 reported that he broke out of the weather at 1,000 feet and approximately 5 miles from the runway. Creek 2 reported that he broke out of the weather at approximately 600 feet and 2-1/2 miles from the runway. At that time, he appeared to be on course and on glidepath, with the runway in sight. (Tab V-2.25, V-3.2, V-7.3)

S. DIRECTIVES AND PUBLICATIONS. The following directives and publications were applicable to the operation of the mission:

1. Regulations and Manuals.
 - a. USAFER 51-1, Aircrew Ground Training.
 - b. USAFEM 51-50, Volume I & VIII, Tactical Fighter and F-16 Aircrew Training.
 - c. USAFER 55-116, F-16 Pilot Operational Procedures.
 - d. USAFER 55-27, Air Force Life Support Systems Program.
 - e. USAFER 55-54, Control of Aircraft for Off-Station Training/Diverts.
 - f. USAFER 55-55, Aircraft Surge Launch and Recovery (ASLAR) Aircrew Procedures.
 - g. USAFER 55-79, Aircrew/Weapons Controller Procedures for Air Operations.
 - h. AFR 60-1, Flight Management.

- i. AFR 60-2, Aircrew Standardization/Evaluation Program.
 - j. AFR 60-16, General Flight Rules.
 - k. USAFER 60-17, USAFE Buffer Zone Procedures.
 - l. USAFER 66-5, Combat Orientated Maintenance Organization.
 - m. AFCENT Low Fly Handbook.
2. Technical Orders (T.O.).
- a. 1F-16C-1, F-16C/D Flight Manual B Revision.
 - b. 1F-16C-1CL-1, F-16C/D Check List B Revision.
 - c. 50 TFW Pilot Aid.
 - d. 1F-16C-6, Scheduled Inspection and Maintenance Requirements.
 - e. 1F-16C-6WC-1, Inspection Workcards.
 - f. 1F-16C-2-70FI-00-1, Fault Isolation - Power Plant.
 - g. T.O. 33-1-37, Joint Oil Analysis Program Laboratory Manual.
 - h. 50 TFW MOI 66-26, Standardized Aircraft Forms Documentation.
 - i. T.O. 00-35D-54, USAF Material Deficiency Reporting and Investigating System.

3. Supporting Information.

a. The mishap pilot stated that he does not trim during an approach, due to the aircraft stability and flight control/trim system. Experienced F-16 pilots state that some, but very little, trim is needed when configured for an approach. Lt Col Holm, 50 TFW Chief of Standardization and Evaluation, and a former flight control instructor, stated that the F-16C-1 Flight Manual would be improved with some clarification and a slight expansion of the proper trim technique discussion. (Tab V-2.47, V-11.10, V-19)

b. The purpose of T.O. 00-35D-54, USAF Material Deficiency Reporting and Investigating System, is to establish a system to identify, report, and resolve deficiencies on hardware, software, mission critical computer systems, vehicles, clothing and textiles. (Para 1-1.1). The T.O. applies to all USAF agencies. (Para 1-2.1). The T.O. defines a Material Deficiency Report (MDR) as: A report of a product deficiency which occurs after Program Management Responsibility Transfer (PMRT) or the Service Report (SR) cutoff date and which:

- If uncorrected, would cause death, severe injury, or severe occupational illness, or

- If uncorrected, would cause major loss or damage to equipment or a weapon system. (Para 1-4.17) (Tab 0-19,21)

Table 2-1 of the T.O. directs an activity (unit) to submit an MDR within 72 hours of discovery of a defect that meets the above stated criteria. (Page 2-15) (Tab 0-25)

4. Known or suspected deviations from T.O. 00-35D-54 instructions follow:

a. Maintenance personnel at MacDill AFB, Florida sent UFC FJA 51458 to SA-ALC for repair for recurring "AB blowout" problems without submitting an MDR. (Tab J-11, J-13, J-17; Ref T.O. 00-35D-54, page 2-15, Table 2-1).

b. Maintenance personnel at Homestead AFB, Florida sent UFC FJA 51458 to SA-ALC for repair for "low power/thrust loss" problems without submitting an MDR. (Tab J-12, J-13, J-18, J-20; Ref: T.O. 00-35D-54, page 2-15, Table 2-1)

c. Maintenance personnel at Moody AFB, Georgia returned UFC FJA 51458 to SA-ALC for repair for "low thrust" problem without submitting an MDR. (Tab J-12, J-13, J-19; Ref: T.O. 00-35D-54, page 2-15, Table 2-1)

Erwin C. Catts III
ERWIN C. CATTIS III, Lt Col, USAF
Accident Investigation Officer

I have observed and reviewed all aspects of this investigation and find that it has been conducted in a legally sufficient manner in accordance with AFR 110-14, AFR 120-4, and other applicable directives. Any information from the documents included in this report which would not be appropriate for release under provisions of the Privacy Act has been deleted.



DANIEL J. MCGRAW, Capt, USAF
Accident Board Legal Advisor

The following originals were not included in the Accident Investigation Report. They can, if required, be located as indicated.

1. Capt Wilmot's Flight Records
 - a. Flight Data Records and History - 50 TFW Base Flight Records Management Office, Hahn AB.
 - b. Flight Training Records - 496 TFS, Hahn AB.
 - c. Flight Evaluation Folders - 50 TFW Standardization/Evaluation Office, Hahn AB.
2. Capt Wilmot's Medical Records - Flight Surgeon's Office, 50 TFW Hospital, Hahn AB.
3. Weather Form 28 and Briefing Log - Det 8, 31 WS, Zweibrucken, AB.
4. Weather Tele-autowriter Strip - Det 14, 31 WS, Hahn AB.
5. AFTO Forms 338 (Survival Kit Record) and 392 (Parachute Inspection and Component Record) for ejection seat - 50 TFW, Office of the Staff Judge Advocate, Hahn AB.
6. USAFE Forms 406, Consolidated Flight Authorization/Approval - 496 TFS, Hahn AB.
7. Crash site diagram - 50 TFW Office of the Staff Judge Advocate, Hahn AB.
8. All maintenance documentation originals of aircraft 84-1289 not included in the original copy of this report, and all photo negatives, can be located in the 50 TFW Office of the Staff Judge Advocate, Hahn AB.

I certify that all copies of the above documentation used in this report are true and accurate.

Erwin C. Catts III
ERWIN C. CATTS III, Lt Col, USAF
Investigation Officer